

lowest pressure moved rapidly over Montana and Dakota to Manitoba, accompanied by light snow or rain and brisk southerly backing to brisk and high northwest winds. Southerly winds and high temperatures prevailed from the Rocky Mountains and the Northwest to the Gulf coast, with clear or fair weather, except in the Southwest, where increasing cloudiness and rain was reported. A heavy thunder-storm occurred at San Antonio from 5 to 6 p. m., and commenced at Corsicana at 7:20 p. m. A tornado is reported to have passed over the town of Lockhart, Texas, at 9 p. m., which destroyed forty houses, killed one child and injured several persons. 27th, was central north of the Lake region and warm southerly winds, cloudy and rainy weather prevailed thence to the Gulf coast and New England; during the latter part of day, clearing or clear weather west of the Mississippi and over the Upper Lakes. 28th, centre passed over Maine and Nova Scotia; southerly to westerly winds and high temperatures continued over the Gulf and Atlantic States, with partly cloudy weather and occasional light rain. In the Lake region and Ohio valley the winds changed to west and north, where the temperature fell about ten degrees. From the 29th to the 31st the pressure continued low and falling over the Canadian Maritime Provinces, with northwesterly winds and occasional light snows. Cautionary Signals were ordered up at Milwaukee, Grand Haven and Ludington on the morning of the 26th; from Cape Hatteras to New York at midnight of the 26th, and along the coast of New England morning of the 27th. These were justified at most stations, the following velocities being recorded: Milwaukee, SE., 30; Grand Haven, —, 32; Alpena, S., 36; Cape May, SW., 30; Wood's Holl, SW., 44.

No. XV—probably developed over the interior of Texas on the 30th, on which day a tornado is reported to have passed northward over a portion of the town of New Braunfels, 30 miles NE. of San Antonio, by which "several buildings were blown to atoms and heavy weights carried great distances;" the storm-cloud moved from the south and was accompanied by hail. Throughout the whole day southerly winds, with temperatures ranging from 63° (a. m. min.) at Mason to 83° (p. m. max.) at Laredo, prevailed south of the 32d parallel, while north of this line northerly winds, with temperatures ranging from 40° (a. m. min.) at Fort Sill to 49° at Fort Griffin. 31st, the depression passed over the Gulf and South Atlantic States, accompanied by cloudy and rainy weather.

## INTERNATIONAL METEOROLOGY.

On chart No. IV. are shown the probable tracks of storm-centres over the oceans, and in the upper right hand corner will be found an index to the same. The following is a brief account of each storm, with a few items selected from the large mass of data made use of. No. I moved northeast off the west coast of Europe on November 23d and 24th and developed into an extensive area of low pressure, which continued over that continent until the 31st. No. II is a continuation of low pressure area No. VIII described in the December REVIEW, which continued its rapid northeast movement over the Atlantic, where low pressures and stormy weather had prevailed for several days previous. It was encountered on the 28th by steamer "Anchoria" in lat. 45° 46' N. long. 49° 43' W., where the pressure had decreased to 28.60; and on the 29th and 30th by steamer "Austrian," which vessel reports the low pressure of 27.88 at 6 a. m. of the 30th in 53° N. 25° W. At Monach Lighthouse, Inverness, the pressure fell during the 29th and 30th and on the morning of the 31st reached 28.50, wind south; at 1 p.m. the wind "flew round like a shot" to north with rising pressure. It is highly probable the storm-area No. (VI and VII,) described in the *December Review*, passed eastward north of New Foundland on December 25th; was encountered on the 27th in 51° N., 31° W. by steamer Mac Gregor, which vessel reported, "wind blew with terrific force, causing tremendous sea, lost four life-boats, 190 head of cattle and 500 sheep;" and finally joined the present storm-area on the 29th to the northwest of the Irish coast. No. III probably formed in the southwest quadrant of area No. II, developed into a severe storm on January 2nd, central about lat. 50° N., lon. 40° W., and after moving north-northeast disappeared on the 5th. No. IV. is a continuation of low pressure area No. II of the present *Review* and which was probably joined on the 9th by a secondary storm-centre (No. V,) from the southward, after which it moved southeast toward France. No. VI is a continuation of area No. IV of the present *Review*, which closely followed in the path of the preceding area, until it arrived at mid-ocean, after which it passed to the north of the British Isles. No. VII probably formed in the southwest quadrant of the preceding area and moved southeastward to France. *Pacific Ocean*.—An area of very low pressure probably existed and moved somewhat in the direction of track traced on Chart from December 19th to the 24th, but sufficient reports are not yet to hand to justify a fuller report.

## TEMPERATURE OF THE AIR.

The isothermal lines on chart No. II illustrate the general distribution of the temperature of the air for the month. By reference to the table on the left side of the chart, it will be seen that the temperature of the month has been very generally about or below the normal except in the Rio Grande valley, the Missouri valley and at the Rocky Mountain stations, where it has been about one and a half degree above.

*Minimum and Maximum Temperatures, respectively:—Maine*—Orono, —21° and 34°; Eastport, —13°, 36°; Portland, 3°, 43°. *New Hampshire*—Mt. Washington, —29°, 26°. *Vermont*—Woodstock, —25°, 51°; Burlington, —12°, 46°. *Massachusetts*—Billerica, —11°, 52°; Boston, 0°, 56°; Springfield, —5°, 52°. *Rhode Island*—Newport, 3°, 44°; Ft. Adams, —4°, 46°. *Connecticut*—Mystic, —16°, 52°; New Haven, 3°, 54°; New London, 0°, 48°. *New York*—Schroon Lake, —33°, 50°; Plattsburg, Bks., —17°, 36°; Buf-

falo, 1°, 43°; Oswego, 1°, 46°; New York City, —3°, 50°. *New Jersey*—Somerville, —11°, 47°; Trenton, 0°, 52°; Princeton, —8°, 49°. *Pennsylvania*—Franklin, —13°, 40°; New Castle, —16°, 47°; Pittsburgh, —11°, 54°; Philadelphia, —3°, 56°. *Delaware*—Dover, 2°, 62°. *Maryland*—Emmitsburg, —10°, 58°; Cumberland, —5°, 52°; Baltimore, 0°, 64°. *District of Columbia*—Washington, —0.5°, 66°. *Virginia*—Wytheville, —6°, 60°; Dover Mines, 8°, 71°; Mt. Solon, —2° 56°. *West Virginia*—Helvetia, —14°, 60°; Wellsburg, —12°, 48°; Morgantown, —5°, 60°. *North Carolina*—Highlands, —1°, 65°; Wilmington, 19°, 78°; Murphy, 0°, 69°. *South Carolina*—Aiken, 15°, 78°; Charleston, 23°, 80°. *Georgia*—Gainesville, 10°, 72°; St. Marys, 24°, 78°; Augusta, 17°, 79°. *Florida*—Daytona, 30°, 76°; Gulf Hammock, 22°, 83°; Jacksonville, 25°, 80°. *Alabama*—Green Springs, 8°, 74°; Mobile, 15°, 73°; Montgomery, 14°, 75°. *Mississippi*—Vicksburg, 12°, 80°; Fayette, 7°, 76°. *Louisiana*—New Orleans, 20°, 78°; Pt. Pleasant, 10°, 77°; Oka-look, 5°, 79°. *Texas*—Gilmer, —1°, 78°; Jacksboro, —2°, 80°; Laredo, 25°, 83°; Austin, 16°, 78°; Galveston, 23°, 71°; Corsicana, 4°, 78°. *Ohio*—Jacksonburg, —25°, 58°; Urbana, —23°, 51°; Columbus, —20°, 56°; Cincinnati, —10°, 64°. *Kentucky*—Danville, —12°, 66°; Bowling Green, —8°, 74°; Louisville, —10°, 66°. *Tennessee*—Clarksville, —10°, 70°; Austin, —6°, 76°; Memphis, 6°, 70°. *Arkansas*—Mt. Ida, —9°, 72°. *Michigan*—Detroit, —15°, 44°; Grand Haven, 0°, 48°; Niles, —18°, 47°; Marquette, —6°, 45°. *Indiana*—Arlington, —25°, 57°; Spiceland, —23°, 56°; Indianapolis, —22°, 57°. *Illinois*—Sterling, —28°, 49°; Peoria, —21°, 46°; Mt. Sterling, —22°, 58°; Cairo, —6°, 64°; Chicago, —18°, 49°. *Missouri*—Ashley, —27°, 60°; Pierce City, —16°, 56°; Corning, —23°, 52°; St. Louis, —14°, 59°. *Kansas*—Topeka, —19°, 62°; Holton, —18°, 54°; Leavenworth, —14°, 56°; Dodge City, —9°, 61°. *Wisconsin*—Neilsville, —30°, 38°; Embarrass, —26°, 45°; Milwaukee, —20°, 46°. *Iowa*—Ames, —30°, 38°; Tabor, —22°, 54°; Dubuque, —22°, 46°; Des Moines, —21°, 52°. *Nebraska*—Genoa, —26°, 70°; Plattsmouth, —24°, 60°; Omaha, —22°, 62°. *Indian Territory*—Ft. Sill, —9°, 70°; Ft. Gibson, —5°, 71°. *Minnesota*—Breckenridge, —32°, 47°; Duluth, —28°, 45°; St. Paul, —26°, 49°. *Dakota*—Pembina, —32°, 36°; Bismarck, —29°, 46°; Yankton, —30°, 62°; Olivet, —29°, 65°. *Colorado*—Pikes Peak, —33°, 30°; Denver, —10°, 61°; Georgetown, 5°, 62°. *New Mexico*—Santa Fe, —2°, 76°; Ft. Union, —4°, 72°. *Wyoming Territory*—Cheyenne, —15°, 60°; Ft. Fred. Steele, —27°, 55°. *Montana*—Virginia City, —16°, 44°. *Utah*—Salt Lake City, 4°, 54°. *Nevada*—Winnemucca, —14°, 55°; Pioche, 5°, 57°. *Idaho*—Boise City, 3°, 53°. *California*—San Francisco, 40°, 62°; Los Angeles, 36°, 74°; Red Bluff, 27°, 63°; Sacramento, 29°, 63°; Visalia, 24°, 63°. *Oregon*—Portland, 20°, 52°.

*Ranges of Temperature.*—The monthly ranges will appear from an examination of the minima and maxima just given. Greatest daily ranges vary in New England from 24° at Newport to 38° at Burlington; Middle States, 25° at Cape May to 39° at Albany; South Atlantic States, 19° at Cape Lookout to 36° at Atlanta; Gulf States, 20° at Key West to 36° at St. Marks; Ohio valley and Tennessee, 27° at Louisville to 38° at Pittsburgh and 33° at Knoxville; Lake region, 27° at Milwaukee to 41° at Sandusky; the Northwest, 23° at Davenport to 56° at Yankton; Rocky Mountain stations, 27° at Virginia City to 44° at Denver and Santa Fe; Western Plateau, 23° at Salt Lake City to 40° at Winnemucca; California, 14° at San Francisco to 32° at San Diego.

*Frost*—has occurred nearly every day over the northern sections of the country; in the interior of the Southern States and Texas, from the 1st to 21st, 24th; along the Gulf coast, 4th to 10th, 12th, 14th and 21st.

*Ice* formed in the Gulf and South Atlantic States and on the Pacific coast as follows: Green Springs, Ala., 3rd, 4th; Mayport, Fla., 4th, misty rain, freezing as it fell, forming fringes of ice along the eaves of buildings a foot in length, branches and twigs of trees covered with a glittering coat of ice, which did not entirely disappear until the morning of the 7th, an extremely unusual occurrence here; Pt. Pleasant, La., 2nd to 7th, 9th, 10th, 19th, 20th; Franklin, N. C., 3rd, skating on pond, ice 3½ to 6 inches thick; Gilmer, Tex., 20th to 22nd; Sacramento, 15th, 16th, 18th to 21st, 30th, 31st; Visalia, Cal., 15th; Stockton, Tex., 5th; Eagle Pass, Tex., 4th, 6th, 9th, 12th, 19th; Decatur, Tex., 6th, battery frozen, 11th, ice on telegraph wire; Indianola, Tex., 6th; New Orleans, La., 5th; St. Marks Fla., 4th to 7th; Mobile, 3rd, 5th, 20th; Jacksonville, 5th.

*Ground Frozen.*—Green Springs, Ala., 20th; Franklin, N. C., 3rd, 12 inches.

## PRECIPITATION.

On chart No. III. is illustrated the general distribution of precipitation for the month. On the left side is a table giving the average precipitation for the month, which shows a large excess over Tennessee; a slight excess in the St. Lawrence Valley, Western Gulf States and California, and elsewhere a general deficiency which is greatest in the East Gulf States and Oregon.

*Special Heavy Rains.*—8th and 9th, Knoxville, Tenn., 3.99 inches; Chattanooga, 3.12 in.; Fayetteville N. C., 6.00 in. 11th and 12th, Dover Mines, Va., 2.50 in.; Chattanooga, 3.31 in.; Gainesville, Ga., 2.77 in.; Murphy, N. C., 3.50 in.; 12th, Weldon, N. C., 2.56 in. 15th, North Lewisburg, Ohio, 4.80 in. 17th, Clarksville, Tenn., 2.40 in. 18th and 19th, Fayetteville, N. C., 2.00 in. 27th and 28th, Margaretta, Ohio, 3.70 in.

*Largest Monthly Rain-falls.*—Fayetteville, N. C., 10.25 inches; Knoxville, 9.59; Baton Rouge Bks., La., 9.00; Murphy, N. C., 8.60; Chattanooga, Tenn., (for 23 days,) 8.48; Fort Canby, Wash. Ty., 8.24; Memphis, 7.71; Pt. Pleasant, La., 7.57; Shreveport, 7.31; Mt. Washington, 7.13; Kittyhawk, 6.88; Corsicana, 6.72; Clarksville, Tenn., 6.47; Cape Hatteras, 6.44; McMinnville, Tenn., 6.42; Austin, Tenn., 6.38; Vicksburg, 6.18.